



Northern Rhodesia

Department of Agriculture

ANNUAL REPORT
for the Year
1956

Price : 2s. 6d.

1957

PRINTED BY THE GOVERNMENT PRINTER
LUSAKA



CONTENTS

Paragraphs

PART I.—AGRICULTURE IN THE TERRITORY

Introduction	1-9
Crop Reports:	10
Maize	11-13
Sorghums and Millets	14
Rice	15
Wheat	16
Groundnuts	17-18
Pulses	19
Cassava	20
Vegetables and Fruit	21
Cotton	22
Tobacco	23-24
Coffee	25

PART II.—WORK OF THE DEPARTMENT

Policy and Organisation	26-27
Staff	28
Self-Accounting Procedure	29
Special Investigations	30
(i) Copperbelt Land Use Survey	31
(ii) Gwembe Resettlement	32
(iii) Plateau Tonga Land Use Survey	33
Extension Services	34
Extension Methods	35
Conservation Work	36-37
African Farming Improvement Scheme	38
African Farming Improvement Scheme in the Southern and Central Provinces	39-41
African Farming Improvement Scheme in the Eastern Province	42
Peasant Farming Scheme	43-48
School Farms and Gardens	49
Agricultural Education	50-52
Buildings	53
Research and Specialist Services:	
Mount Makulu Central Agricultural Research Station	54-55
Agricultural Chemistry	56-57
Soil Survey	58-59
Ecology	60
Plant Pathology	61
Pasture Research	62-65
Plant Breeding	66
Irrigation	67
Tobacco	68
Conferences, Boards and Committees	69
Legislation	70
Publications	71
Visitors	72
In Conclusion	73

Appendix I.—Staff Position as at 31st December, 1956.

Appendix II.—Staff List as at 31st December, 1956.

Department of Agriculture

ANNUAL REPORT FOR THE YEAR 1956

PART I—AGRICULTURE IN THE TERRITORY

INTRODUCTION

In consequence of the transfer of non-African agriculture to the control of the Federal Department of Conservation and Extension, with effect from 1st January, 1956, this report will be confined to the affairs of African agriculture. The responsibility remaining with the territorial Department following this transfer is still considerable since it concerns the farming activities of the majority of the 2,060,000 Africans in the Territory who have access to some 173,676,000 acres of land made up as follows:

Native Reserves	...	...	34,713,000	acres
Native Trust Land	...	...	109,536,000	acres
Barotseland	...	...	29,427,000	acres

One of the important advantages claimed for the sub-division of agriculture in Northern Rhodesia was the opportunity it would provide for concentration upon the special problems of African agricultural development the nature and tempo of which differ in so many respects from the problems confronting European agriculture.

2. The year has witnessed the beginnings of an important development in approach to African agricultural advancement to include planned land usage on a comprehensive regional basis. The availability of aerial photographs has facilitated this change. There now arises a clear need for the closer integration of crop and animal husbandry, together with attention to the economic aspects of production and marketing and the supply of rural credit.

3. A number of fact-finding surveys preliminary to planning have been carried out during the year, notably the Copperbelt Land Use Survey in the Western Province, the Ngoni Land Use Survey in the Eastern Province, surveys in the Gwembe Valley in connection with the resettlement of 28,000 people disturbed by the Kariba Hydro-Electric project, soil reconnaissances in selected areas of the Sala Reserve in the Mumbwa district of the Central Province, and near Solwezi in the North-Western Province. An important survey was started towards the end of the year in the Mazabuka district of the Southern Province which is likely to be of considerable significance in deciding the future pattern of land use planning on a regional basis in African areas.

4. Research and specialist services have been further extended during the year based upon the Central Agricultural Research Station at Mount Makulu, where the land use planning section is located. The revised Four-year Plan envisages the development of four regional sub-stations. A small experimental plot of some fifty acres has been established near the Chiansi Lagoon on the north side of the Kafue Flats, and pumping equipment has been installed. On the south side of the Flats, 600 acres have been empoldered in an exhilarating pilot scheme financed by the Rhodesian Selection Trust Limited, and carried out under the guidance of a famous firm of Dutch consultants—N.E.D.E.C.O. It is hoped that this scheme, which makes provision for investigations into irrigated settlement on both a European and an African scale, will be successful in indicating how Central Africa may become self-supporting in wheat, a commodity growing in popularity and at present imported mainly from Australia.

5. Extension facilities have continued to expand in accordance with the Development Plan as staff became available. Some thirty-eight Agricultural Stations distributed throughout the Territory now serve as extension bases, their work being co-ordinated provincially: in all areas steady progress is being made, the pace in the Eastern Province being particularly outstanding. It is pleasing to record much less political interference with extension work during the year, but in many areas Native Authorities are tending to lag behind their responsibilities and their opportunities as the rightful leaders of the people.

6. The protection of arable lands from erosion is generally good throughout the country. More attention is now required to the management of grasslands, a development complicated by the special place of livestock in the social economy. Attention has been paid to the protection of the headwaters of the important territorial rivers which rise in the natural sponges found along our boundary with the Belgian Congo in the North-Western Province.

7. An important development during the year has been the revival of the Board of African Agriculture which provides a useful forum on a territorial level for the discussion of all matters pertaining to the development of African agriculture.

8. The number of African-owned tractors continues to increase in the Central and Southern Provinces and now the Eastern Province. It is apparent that more attention will have to be given in the future to the implications of this development from the mechanical, economic and land tenure aspects.

9. The staff situation has improved in some respects throughout the year but progress is still retarded by a shortage of professional officers in the field.

CROP REPORTS

10. Following a late start the main feature of the 1955-56 season was prolonged and heavy rain which extended well into April: with the notable exception of the Northern Province, which suffered from a shortage of sunshine during the harvest months, bumper crops were reported from almost all parts of the Territory. Food requirements in rural areas were adequately met and considerable surpluses of major crops, particularly maize and groundnuts, were marketed.

Maize

11. The total maize crop delivered to the Maize Control Board in 1956 was 1,612,165 bags of 200 lb. net weight, of which 719,734 bags, i.e. 44 per cent, were produced by African farmers. The main African producing areas were the Southern, Central and Eastern Provinces, which supplied to the line-of-rail markets 427,830, 171,900 and 120,000 bags respectively. The trend of production from both European and African growers on the line of rail during the past ten years is shown in the following table:

MAIZE PRODUCTION FOR SALE IN THE RAILWAY BELT
(Thousands of bags of 200 lb.)

Year	European grown	African grown	Total
1947 ...	190	54	244
1948 ...	343	296	639
1949 ...	283	61	344
1950 ...	447	344	791
1951 ...	399	290	689
1952 ...	389	173	562
1953 ...	602	435	1,037
1954 ...	661	595	1,256
1955 ...	615	320	935
1956 ...	893	600	1,493

The standard line-of-rail price paid by the Maize Control Board was 41s. 6d. per 200 lb. bag net weight exclusive of the value of the bag. African producers received a flat rate of 30s. per bag delivered to Maize Control Board rural buying depots. The difference between the 30s. paid to African producers and the standard price was credited to the African Farming Improvement Fund after meeting the cost of transport and handling from the rural buying depots. In the Eastern Province the standard price of maize was fixed at 19s. per bag net weight of 200 lb. exclusive of the value of the bag, delivered to Eastern Province produce depots. In the case of African producers, who are responsible for the bulk of the crop, a contribution of 2s. 6d. per bag is paid into the Eastern Province African Farming Improvement Fund.

12. The Eastern Province also exceeded its last year's record of maize production as shown in the following table:

MAIZE MARKETED IN THE EASTERN PROVINCE
(Bags 200 lb. net weight)

Year	Local production	Imports	Total	Exports
1949 ...	30,500	22,500	53,000	Nil
1950 ...	48,000	12,000	60,000	Nil
1951 ...	80,000	Nil	80,000	37,700
1952 ...	101,000	Nil	101,000	77,670
1953 ...	129,100	Nil	129,100	107,764
1954 ...	101,186	Nil	101,186	65,000
1955 ...	133,809	Nil	133,809	100,000
1956 ...	148,149	—	148,149	120,000

The Eastern Province maize crop is marketed efficiently through the Eastern Province Agricultural Produce Board. It is considered that surplus production in the Province is now reaching the limit of economic backload transport to line-of-rail markets, and efforts are being made to stabilise production at its present level.

13. Encouraging prices, favourable seasons and improved techniques have all contributed to the present high level of territorial maize production. There is now an urgent need for encouraging the feeding of more maize to livestock and for fostering alternative cash crops. The Territory is carrying too big a surplus of maize and at the same time is short of animal protein. A pig and poultry scheme prepared by Mr. J. N. Hobday, O.B.E., Special Commissioner, is being put into operation in the Eastern Province, based upon the availability of low-priced maize in that part of the country. There is a small but growing production of maize for internal consumption in various parts of the Territory away from the line of rail, notably in the Northern Province, Barotseland and the North-Western Province. In the Northern Province local deficiencies in production have had to be met by importation from Tanganyika.

Sorghums and Millets

14. Local surpluses of sorghum and finger millet are available from subsistence production in the Northern and Eastern Provinces: there is little commercial demand for these grains and they do not enter to any extent into territorial trade.

Rice

15. There has been no change in the rice position during the past year. Useful small-scale production continues in Barotseland, where an increase in local consumption in place of cassava is to be welcomed. In the Balovale district, where conditions appear to be particularly well suited to rice production, a small industry is struggling against the problem of lack of markets for the comparatively low-quality rice at present available. The Eastern Province produced a fair quantity of rice during the year, and small quantities were grown in the Bangweulu/Luapula area of the Northern Province. The total crop marketed throughout the Territory was around 400 tons of paddy and a few hundredweights of hand-hulled rice. The quality of the local product still leaves much to be desired mainly because of the mixed nature of the rice grown leading to unsatisfactory milling: attention is being paid to this. The territorial demand for rice would appear to be limited and there seems to be little hope of economic export at the present time: growers have an inflated notion of the value of rice as a cash crop, transport costs to world markets are heavy and, as already stated, the quality of the product is poor.

Wheat

16. Local production is confined to one or two European farmers with winter irrigation facilities. Government guaranteed a price of 70s. a bag for the 1956 season inclusive of the value of the bag which compares with a landed cost of Australian wheat of around 56s. Imports into Northern Rhodesia in 1956 totalled some 18,000 tons. There are indications that winter wheat might prove a profitable cash crop on the edge of the flood plain in Barotseland: production from this source, however, is unlikely to be very great. A better hope for future home-grown supplies lies in the irrigated pilot polder project on the Kafue Flats. Plant breeders are working on rust-resistant summer wheats but recent Kenya experience suggests that we should not be too optimistic as to the outcome of this work.

Groundnuts

17. Groundnuts are an important subsistence crop in all parts of the Territory: they are commercially important only in the Eastern Province and in the Kabompo and Balovale districts of the North-Western Province. Government guaranteed a price of £45 10s. per ton for shelled nuts delivered to the line of rail. The Eastern Province crop was handled by the Eastern Province Agricultural Produce Board for whom the Maize Control Board acted as agents during the year. The following Table shows the remarkable increase in production of nuts in the Eastern Province from a mere 4,000 bags in the 1951-52 season, to a record crop of 66,580 bags this season:

EASTERN PROVINCE GROUNDNUT PRODUCTION IN BAGS OF 180 LB.

Season	1951-1956					Total
	Fort Jameson	Katete	Chadiza	Petauke	Lundazi	
1951-52 ...	900	900*	—*	1,200	1,250	4,250
1952-53 ...	6,000	7,500*	—*	12,000	890	26,390
1953-54 ...	22,122	10,350*	—*	26,350	355	59,177
1954-55 ...	11,789	9,877	14,646	15,937	915	53,164
1955-56 ...	15,828	9,098	13,868	22,437	5,400	66,631

* Figures for Chadiza 1951-54 included in Katete totals.

18. All local demands for oil expression and ration nuts were fully met, and the bulk of the crop was exported profitably overseas through railhead at Salima in Nyasaland and the port of Beira. Eastern Province nuts are of confectionery quality which commands a premium on the overseas market. From an agricultural, dietetic and economic point of view the groundnut crop is very desirable, and its production is receiving every encouragement.

Pulses

19. The main pulses grown are cowpeas and haricot or sugar beans, used almost entirely for subsistence purposes. Yields are relatively low and uncertain and there is little demand for the small surpluses of cowpeas which become available from time to time in the Eastern Province. Many African farmers on the line of rail find it profitable to grow sunnhemp and velvet beans for seed purposes in rotation with maize, the seed being sold to the Farmers' Co-operative in Lusaka to supply European requirements of green manure seed.

Cassava

20. Approximately 600 tons of cassava meal is marketed in the North-Western Province for sale particularly to Barotseland, and some 170 tons is marketed in the Northern Province. The cultivation of cassava is not encouraged beyond famine reserve requirements largely because of the wasteful cultivation methods by which it is produced. Many acres of woodland have been destroyed along the banks of rivers in the North-Western Province for the production of cassava.

Vegetables and Fruit

21. Small quantities of African-produced vegetables and fruit are marketed near centres of population, particularly around Lusaka, Fort Jameson and the Copperbelt towns. Production and marketing techniques leave much to be desired and attention must be paid to their improvement: considerable quantities of fresh fruit and vegetables are imported into the Territory which could well be produced locally.

Cotton

22. Prolonged rains encouraged the build-up of pests attacking cotton in the Luangwa Valley, and in spite of regular dusting with D.D.T. and B.H.C. the total production in the Eastern Province declined to 34,480 lb. of seed cotton of which 75 per cent was stained. The number of growers also dropped from 759 last year to 580 in 1956. Efforts are being made to revive the industry which provides the only cash crop so far discovered which is suited to valley conditions.

Tobacco

(a) *Burley*

23. It is with regret that little improvement can be recorded in the Eastern Province Burley tobacco position. Production in 1956 totalled 6,890 lb. which realised 18.29*d.* per lb. on the Limbe auction floors. The decline has proceeded steadily from over a quarter of a million pounds in 1950 and coincides with an increase in production of maize and groundnuts from the same area. Economic difficulties inhibit the revival of the industry at the present time because the small production has to bear unduly heavy overhead expenses for seedbeds and handling with the result that producers receive for their tobacco less than half the price realised on the auction floors. It is felt that there is an important place for Burley tobacco as a cash crop on the red loams of the Eastern Province, and strong efforts will continue to be made to revive the industry.

(b) *Turkish*

24. Small-scale production of Turkish tobacco was carried out on an exploratory basis on light sandveld soils in parts of the Southern, Central and Eastern Provinces, where alternative cash crops present difficulty. The indications for the future appear to be favourable. In the Eastern Province 6,714 lb. were sold at an average price of 29.27*d.* per lb: outstanding results were obtained at Lundazi where 2,000 lb. realised the satisfactory average price of 40*d.* per lb. In the Southern Province 4,994 lb. were sold for an average price of 28.53*d.* per lb. In the Central Province 755 lb. realised an average price of 38*d.* per lb. Growers have been generally satisfied with their returns and it is expected that production will be increased in the coming year.

Coffee

25. Efforts are being made to encourage the production of coffee in the Ikumbi area of the Isoka district in the north-east corner of Northern Rhodesia, on the borders of Tanganyika. A few hundred trees have so far been established with planting material obtained from Tanganyika. A factor likely to limit the success of this development is the generally backward farming experience of the people.

PART II.—WORK OF THE DEPARTMENT

POLICY AND ORGANISATION

26. The Department of Agriculture is organised into three main sections:

- (i) Headquarters—Administration.
- (ii) Research and specialist services including land use planning, conservation and irrigation.
- (iii) Provincial and district advisory staff.

Steps are being taken to establish a specialist conservation planning section and a tobacco section to assist the provincial and district staff with their programmes.

27. An important development during the year has been the revival of the Board of African Agriculture which held two meetings during the year. The Board consists of the Commissioner for Rural Development, the Provincial Commissioner, Secretariat, the Directors of Water Development and Irrigation and Veterinary Services, the Director of Co-operatives and African Marketing, Mr. Unwin Moffat, O.B.E., together with four African members—Chief Mwanjawanthu from the Eastern Province, Mr. Aaron Mwanachilenga from the Sala Reserve, Mr. A. M. Mubanga from Lusaka and Mr. Amos Walubita from the Southern Province, with the Director of Agriculture as Chairman. The Board is advisory to the Member for Agriculture. Useful discussions took place during the year upon such subjects as human nutrition, the integration of animal and crop husbandry, the integration of marketing and crop production, regional planning, extension and publicity methods and the progress of rural betterment schemes.

Staff

28. In common with other sections of Government, progress has been hampered by staff shortage, particularly a shortage of professional officers, and by staff changes. Out of an authorised establishment of three Chief Agricultural Officers and twenty-five Agricultural Officers only three Chief Agricultural and seventeen Agricultural Officers have been available during the year. Two newly appointed officers arrived from their course in Trinidad but one experienced Agricultural Officer was transferred on promotion to Fiji. Three probationers are at present undergoing post-graduate training. A welcome addition to the staff was a Conservation Officer (Planning) who became available towards the end of the year. The Agricultural Economist was transferred to Jamaica during the year, and at the time of writing no replacement has been found. The Pasture Research Officer transferred to Nigeria and has not yet been replaced: the Ecologist, however, has taken over his programme. A replacement arrived during the course of the year for the Plant Pathologist who transferred to Tanganyika last year. Two Supervisors retired, one was transferred to the Provincial Administration, and one resigned during the year: ten newly appointed Supervisors, however, took up their appointments. The Department has been fortunate in securing the appointment of two experienced Research Assistants together with three experienced male Clerks. Three promotions to the rank of Principal Agricultural Supervisor were made during the year, and the upgrading of the Office Superintendent to the post of Secretary was given effect. Appendix I shows the staff position at the end of the year and Appendix II the Staff List.

Self-Accounting Procedure

29. With effect from the 1st July, 1956, the Department became self-accounting and whilst this development has involved some officers in more paper work and greater responsibility the overall effect has been to increase general efficiency in financial matters. The officers principally concerned with the change-over are to be congratulated.

Special Investigations

30. Fact-finding surveys as a basis for development clearly have an important place in a fast developing country like Northern Rhodesia, and much time is devoted to them. The following outline indicates the more important activities of this nature which have engaged the attention of the staff during the year:

(i) *The Copperbelt Land Use Survey*

31. The intensive survey of some 3,000 square miles of Crown land on the Copperbelt, which was started towards the end of 1954, was completed in March, 1956, and the report was published by the Government Printer. The report contains a comprehensive assessment of the present land position, together with market requirements for the area and recommendations for meeting them. A detailed soil reconnaissance formed an integral part of the whole operation, together with an ecological appreciation. Various other departments, notably, Veterinary, Forestry and Water Development and Irrigation, contributed appendices on their aspects of the investigation. The way is now clear for sound agricultural development on the Copperbelt.

(ii) *Gwembe Resettlement*

32. The Department has been closely concerned with planning the resettlement of some 28,000 people who will be displaced by the Kariba Hydro-Electric project. A Conservation Planning Officer was loaned to the Department by the Federal Department of Conservation and Extension to assist in the preparation of maps for the area from aerial photographs. Field staff was increased to provide the necessary ground control and to make contact with the people. It has been considered desirable to resettle the people in the valley so far as this is possible, but the agricultural indications are not encouraging as the following extract from the Annual Report of the Chief Agricultural Officer, Southern Province, shows:

“As a result of this survey the following acreage assessment has been arrived at:

Sinazongwe: 22,200 acres mostly good and among the best in the valley. Nine thousand people to resettle.

Mwemba: 6,000 acres of fair but undulating land liable to erode under cultivation. Much of the land is in small pockets unlike Sinazongwe where there are blocks of 2,000 to 11,000 acres. Nine thousand people to resettle.

Simamba: 13,800 acres. More than half of this is poor thicket. The remainder is a quarter good and a quarter fair. Two thousand people to resettle.

Chipepo: 5,500 acres of ‘londe thicket’ available in small pockets. Eight thousand seven hundred people to resettle.

Singongo: Surveyed by valley staff under the direction of Dr. Ballantyne. Approximate area 25,000 acres. Most of this is considered good. No people to resettle. The proposed Chirundu sugar scheme is included in the acreage quoted. There is therefore 72,500 acres of land, varying from good to poor, available for resettlement for 28,700 people.

The latest report by the Agricultural Officer, Gwembe, estimates that in view of the variable soils an overall figure of five acres would be required per head on traditional methods of agriculture and that if the acreage is reduced serious deterioration of the soil and subsequent famines will ensue.”

Unfortunately the people will be losing the fertile alluvial soils on the river banks which they have been in the habit of planting up successively as the annual flood waters recede. The safety factor in the situation is likely to be the dispersal of a proportion of the population to activities other than agriculture once the move actually takes place. This will be greatly facilitated by the building of access roads with which the valley is being opened up, and the generally increasing economic tempo inevitable as a result of the development of the project itself.

(iii) *Plateau Tonga Land Use Survey*

33. Investigation into the workings of the African Farming Improvement Scheme in the Southern Province has been carried out progressively over a period of three years by Mr. C. E. Johnson, Chief Agricultural Officer, the results of which were published in bulletin form during the year. This work provides the background for a comprehensive regional planning approach for the development of agriculture in the more congested African cash crop areas. Preparations were started during the year for an intensive land use survey which is to be carried out in a carefully selected area in the Mazabuka district. This is probably the most important betterment project so far undertaken by the Department: for success, the full confidence of the people and their co-operation will be essential. Because of the human factors involved, and the need for planning with such delicate subjects as land and livestock, it is clear that this is an operation which must be handled with great care. It is proposed to start the initial survey in the areas of Chiefs Mwanza, Chona and Ufwenuka, where the work of the Department is already well known to the people.

Extension Services

34. For extension purposes the Department is organised upon a Provincial and District basis corresponding with the Administration sub-divisions of the Territory, which in their turn conform with tribal and therefore to a large extent with ecological boundaries. Responsibility is decentralised from headquarters to six Provincial Agricultural Officers. For the time being, owing to shortage of experienced staff, the North-Western Province is administered from Ndola and the Luapula Area continues to be administered from Kasama as a part of the Northern Province. In addition to the six Provincial Agricultural Officers nine Agricultural Officers are in charge of agricultural districts supported by forty-nine Agricultural Supervisors, two hundred and twenty-seven African Agricultural Assistants and three hundred and thirty-four Agricultural Capitaos. There is an urgent need to post an Agricultural Officer to the Northern

Province based at Lunzuwa, to be responsible for the training school and agricultural development in the northern part of the Province, and to Lundazi district in the Eastern Province: it is hoped to fill both these posts during the course of the coming year. New stations have been opened at Chinsali in the Northern Province and Solwezi in the North-Western Province, and services for the Gwembe Valley have been extended. The stations proposed for Sesheke and Namwala have not yet been established, but African staff are preparing the way. The distribution of agricultural stations, province by province, is as follows:

Southern Province	...	8	Mapangazia, Magoye, Monze, Kanchomba, Gwembe, Mapanza, Kalomo and Mochipapa.
Central Province	...	10	Broken Hill, Mumbwa, Keembe, Muchenje, Muswishi, Serenje, Mkushi, Mukulaikwa, Chalimbana and Shibuyunji.
Eastern Province	...	6	Fort Jameson, Chadiza, Kalichero, Lundazi, Petauke and Katete.
Northern Province	...	7	Kasama, Lunzuwa, Isoka, Luwingu, Kawambwa, Fort Rosebery and Chinsali.
Western and North-Western Provinces	...	5	Ndola, Kasempa, Kabompo, Balovale and Solwezi.
Barotseland	...	2	Namushakende and Mankoya.

Extension Methods

35. In addition to the normal farm visits paid by members of the staff, organised Farmers' Days and Agricultural Shows have proved especially useful in awakening and sustaining the interest of groups. Twenty-two Farmers' Days were organised in the Southern Province attended by some 3,000 farmers of whom 40 per cent were not registered improved farmers. Much time and energy is devoted to the organisation of annual shows by the staff who are rewarded by the satisfaction of seeing these shows becoming a regular feature of the farming calendar. The Information Department has co-operated by producing a series of posters illustrating the Department's extension programme which have helped to keep the work of the Department before the public eye in such places as schools, boma and native administration offices, community halls, etc.

Conservation Work

36. The Department has continued to give special attention to soil and water conservation as a normal part of its extension duties. With the unfortunate exception of the escarpment hill country running parallel with the Zambezi in the eastern part of the Southern Province, and in some parts of the Ngoni and Chewa country in the Eastern Province, the erosion position throughout the Territory is very satisfactory. Northern Rhodesia is fortunate in not having unduly heavy population pressures on the land. Where necessary mechanical control is well in hand and the great need now is for better land usage on a more comprehensive basis, particularly with reference to natural grazing lands and protective woodlands. Aerial photography makes such a regional planning approach feasible, and the Department is gaining experience with this important work.

37. Mapangazia pilot conservation scheme in the Upper Kaleya Valley has been further developed by paddocking the grazing area and a proportion of the steeper land has been set aside for afforestation. A number of weirs have been constructed to supply water to the paddocks. The people seem to be reconciled to the scheme and from observation in the area during the current growing season it is very apparent how much the countryside has benefited from the intensive conservation measures which have been taken.

African Farming Improvement Scheme

38. It is well recognised that the development of African agriculture requires not only guidance but also the application of capital under control, and to this end three schemes have been designed and are in operation, namely:

- (i) The African Farming Improvement Scheme, which operates in the scheduled areas of the Maize Control Board in the Southern and Central Provinces.
- (ii) The African Farming Improvement Scheme in the Eastern Province.
- (iii) The Peasant Farming Scheme in all provinces.

The first two schemes are financed from funds derived from levies on maize marketed through the Maize Control Board and the Eastern Province Agricultural Produce Board respectively. The third is financed by a Revolving Fund of some £260,000 provided by a Colonial Development and Welfare loan.

African Farming Improvement Scheme in the Southern and Central Provinces

39. A year of steady progress can be reported. The effective financial control now in force under the guidance of our auditors, Messrs. Deloitte, Plender, Griffiths, Annan and Company, has been of inestimable value to the administering committee, which met twice during the year. There is no doubt that the fund is playing an important part in facilitating the changes necessary from subsistence to commercial farming in the African maize-growing areas on the line of rail. Twenty years ago the gloomiest forecasts were being made of the likely condition of Southern Province reserves unless an agricultural revolution was introduced: the position to-day is that production is higher than it has ever been before.

40. The Statement of Income and Expenditure for the year ending 31st May, 1956, shows that the income to the fund in respect of that year was £137,673 by comparison with £173,330 derived from a bigger crop the previous year, i.e. the 1954-55 season. Expenditure during the year continued roughly at the same level as follows:

	1954-55 £	1955-56 £
Bonuses to Improved Farmers	27,716	34,987
Subsidies on Carts, Fertilisers, Seeds, etc.	29,102	20,625
Soil and Water Conservation Works	28,391	27,616
Grants to Native Authorities	1,360	4,950
Administrative Expenses	728	1,270
Irrecoverable Loans	106	68
	<u>£87,403</u>	<u>£89,516</u>

There was carried to the Balance Sheet approximately £49,431, of which £14,736 represents increased investment in dams, wells and other fixed improvements in African areas, and £7,740 increase of loans to African farmers. The value of Fixed Assets shown in the Balance Sheet was £160,304, Current Assets £561,455. The fund was reimbursed by Government during the year to the extent of £260,737 in respect of the cost of grain bags used for the African crop from 1949 to 1955, which had been wrongly debited to the Native Pool. Surplus funds have been invested on the advice of the Financial Secretary. It is the policy of the Committee to devote its funds to projects of a capital nature as far as this is possible. It is anticipated that the rate of expenditure will increase steadily in the near future as regional planning in maize-producing areas gets under way.

41. A brief summary of the 1956 season's activities is given below. It should be noted that the financial implications of this work will be reflected in the accounts in respect of the year ending 31st May, 1957.

(a) *Bonuses to Improved Farmers*

Three grades of Improved Farmers received bonuses during the 1955-56 season at the rate of 27s. 6d. per acre for Grade I farmers, 18s. per acre for Grade II and 9s. per acre for Grade III. A total of £22,158 was paid to 1,077 Improved Farmers in the Southern Province in respect of 18,769 acres: in the Central Province £12,437 was paid to 371 Improved Farmers in respect of 10,125 acres. Seventy per cent of Improved Farmers were Grade I, 22 per cent Grade II and 8 per cent Grade III. The number of registered farmers in the 1956-57 season shows a further increase. It must be emphasised that the success of the scheme cannot be judged solely upon the number of registered farmers: the great value of Improved Farmers is the demonstration which they give throughout the maize belt of sound farming practices, which has influenced many of their neighbours unable or unwilling to register.

(b) *Subsidies on Carts, Fertilisers, Seeds, etc.*

Some 1,114 scotch carts were sold under the scheme during the year, of these 314 were fitted with pneumatic tyres and 800 with steel wheels. Messrs. Harold Poole Limited were responsible for the distribution. Subsidised prices remained the same as for the previous year, namely, £30 for a rubber-tyred cart and £20 for one with steel wheels. The use of fertilisers is encouraged by subsidising the cost of local transport and in the case of sulphate of ammonia by 50 per cent of the basic cost. A total of 247 tons of sulphate of ammonia was issued to Improved Farmers in the Southern and Central Provinces under the scheme, and 308 tons of superphosphate. Seasonal loans are granted against the security of the anticipated bonus. The supply of improved seeds to Improved Farmers is facilitated by free local transport.

(c) *Conservation Works*

Many miles of storm drains, graded contour ridges and grass strips have been laid down with finance provided by the fund. Ferguson tractors with mid-mounted disc terracers have been largely used for this work. The Department of Water Development and Irrigation erected dams in the Southern and Central Provinces to the value of £17,987 on behalf of the Committee.

(d) *Loans*

The Committee agreed to extend the amount provided for loans to Improved Farmers in each province from £4,000 to £8,000. The limiting factor in the distribution of this capital is the availability of agricultural staff for loan administration. For the current year £5,811 was on loan in the Central Province and £5,606 in the Southern Province at the end of 1956. Loans were made during the year for the purchase of the following implements:

					<i>Southern Province</i>	<i>Central Province</i>
Carts	...	...	...	...	140	17
Ploughs	...	...	...	...	70	69
Cultivators	...	...	...	...	114	27
Harrows	...	...	...	...	56	61
Planters	...	...	...	...	9	5
Grinding Mills	...	...	...	...	2	—
Maize Shellers	...	...	...	...	1	1
Barbed Wire (Rolls)	...	...	...	...	190	10
Oxen	...	...	...	...	17	74

It will be apparent that these loans meet a considerable need but their administration is a heavy responsibility which it is hoped that co-operative societies may one day take over from the Department of Agriculture.

African Farming Improvement Scheme—Eastern Province

42. This scheme, which is administered by the Eastern Province Team, arises from a levy of 2s. 6d. per bag on African-grown maize in the Eastern Province; the income from this source being of the order of £15,000. Funds are disbursed in the form of bonuses for improved farming practices such as the erection of suitable cattle kraals designed for manure making, for subsidies on carts and ridging ploughs, and to provide loans for registered Improved Farmers. A certain amount of conservation work is also paid for by the fund. An important development in the Province has been the extension of the scheme from individual farmers to whole villages in the Petauke, Katete and Kalichero districts where all the inhabitants agreed to farm on an improved basis. The funds available are proving insufficient to keep pace with the progress made under the scheme, and it has recently been recommended that the groundnut crop should make a contribution to the fund.

Peasant Farming Scheme

43. As explained in previous reports, the Peasant Farming Scheme provides capital for the establishment of small-scale commercial farmers who agree to accept guidance from the Agricultural Department in such matters as limitation of acreage, crop rotation, manuring methods and so on: they are required also to sign an agreement with the Native Authority with regard to the repayment of loans in return for which security of title to the holding is guaranteed. Funds, which are provided from a Colonial Development and Welfare loan, are controlled by the Commissioner for Rural Development upon the recommendations of the Provincial Teams and the Director of Agriculture. The scope of the scheme is territory-wide but it has been applied particularly in areas away from the line of rail which do not receive assistance from the African Farming Improvement Scheme.

44. Peasant farms have been established in all provinces but they are to be seen at their best in the Eastern Province, where to some extent the loan facilities of the scheme have been merged with the bonus benefits of their local levy fund. Wherever soil and water conditions are good the scheme has prospered. Originally the benefits were available only to group settlements, but two years ago the scope was extended to individuals where the circumstances were favourable. Up to the present the scheme has been applied mainly to the arable aspects of farming: the next step, which must not long be delayed, must undoubtedly be comprehensive

regional planning taking into account grazing requirements, access roads to village sites, woodlands, water supplies, storm drains and so on. The Eastern Province scheme is gathering considerable momentum as can be seen from the following Table:

NUMBER OF PEASANT FARMS IN EASTERN PROVINCE

		<i>Petauke</i>	<i>Katete</i>	<i>Kalichero</i>	<i>Ngoni Areas</i>	<i>Chadiza</i>	<i>Lundazi</i>	<i>Total</i>
1950-51	B	—	26	—	—	—	—	26
	I	—	—	—	—	—	—	—
1951-52	B	—	26	—	8	—	—	34
	I	—	—	—	—	—	—	—
1952-53	B	16	39	10	10	—	—	75
	I	6	4	—	—	—	—	10
1953-54	B	33	60	13	10	—	—	116
	I	30	15	3	2	—	—	50
1954-55	B	35	82	20	10	—	—	147
	I	47	28	15	5	7	—	102
1955-56	B	69	102	36	16	—	—	223
	I	61	63	19	33	19	—	195
1956-57	B	110	117	54	16	6	13	316
	I	223	63	43	125	115	22	591

(Note.—B=Block Farms; I=Individual Farms)

The incomes received by Peasant Farmers in the Eastern Province have varied considerably from around £20 per annum, from newly established farms, up to £200. The repayment of loans has been satisfactory.

45. Progress is being made with the scheme in the Central Province where important lessons are being learnt from the varied circumstances in which the scheme has been developed. The earliest group settlements were on poor plateau soils in the Serenje district where the farmers have had to struggle but on the more favourable sites they appear to be holding their own. On good red loams in the Mkushi district progress is rapid and settlements are prosperous. The drilling of successful boreholes at Keembe and Mukulaikwa has considerably improved the chances of success of these settlements. The small settlement on poor soil at Muswishi, which is part of the fly barrier protecting Broken Hill, has achieved some success with Turkish tobacco, close supervision being available from the nearby Agricultural Station. The numbers of farmers established in each district are as follows:

			1955-56	1956-57
Serenje	...	...	50	48
Mkushi	...	...	35	44
Muswishi	...	...	10	10
Keembe	...	...	12	23
Mumbwa	...	...	14	14
Mukulaikwa	...	...	—	1
			121	140

Wherever soil conditions and water supplies are satisfactory Peasant Farming goes ahead: the main value of the scheme is clearly to stabilise commercial farming on carefully selected areas of better soil ascertained by survey. It must be appreciated that there is no special magic in the scheme which can confer prosperity in naturally infertile areas. The supply of working oxen is limiting the expansion of Peasant Farming to some extent in the Central Province.

46. In the Western Province there is little change to report in regard to the two Peasant Farming groups established there. The Southern Rhodesian settlement at Nyenyeshi is progressing satisfactorily but the group at Fiwale is experiencing difficulty due to poor soil and indifferent water supplies. An individual farmer in the Ndola Rural Settlement area has been assisted under the scheme to specialise in poultry, a development which would appear to have much to commend it so close to the Copperbelt markets.

47. In the Northern Province where political activity has reduced interest in Peasant Farming, no great extension took place in 1956. A total of 104 farmers was operating during the year, of which thirty-eight were individual farmers in the Luwingu and Kawambwa districts, and the balance was distributed in groups at eleven centres throughout the Province. Provision has been made for expansion in 1956-57 when a total of 158 farmers will be operating. The tempo of development is bound to be slow in the circumstances of the Northern Province, remote as it is from the bustle of the railway line and not richly endowed with fertile soils. It can be said, however, that a useful start with organised farming has been made and, importantly, valuable experience is being obtained as a guide to the pattern of future development. It is essential that agriculture should be stabilised in the Province within a reasonable

period, because the indigenous system of Chitemene cultivation is able to support only a very sparse population. There are already signs of the system breaking down in certain areas, notably the Inamwanga triangle in Isoka district, where rather-above-average soil conditions have permitted too frequent cutting over of the bush.

48. In Barotseland eleven Peasant Farmers have continued to operate in the Lukalanya group during the year, and two new farmers have been established at Kataba. Peasant Farming under Barotseland conditions must continue to be regarded as being in an experimental stage for some time to come.

School Farms and Gardens

49. Attention has been given in all provinces to assisting the African Education Department with the layout and running of demonstration school farms and gardens. As might be expected the results vary with the interest of the teachers, all too few of whom have an appreciation of the significance of agriculture. It is for this reason that the Department is particularly pleased to have been able to arrange for a Teacher Training Course at the Monze Agricultural Training Centre. Of the eleven teachers who started their course in August, 1955, ten passed out satisfactorily in June, 1956. The Principal reported that they were a keen class. It is unfortunate that we have not more of such trained men for their influence can be far reaching.

Agricultural Education

50. The Department has two training centres, one at Monze serving the southern part of the Territory, the other at Lunzuwa near Abercorn serving the northern areas. The basic qualification for entry is still Standard VI although it is apparent that the time is ripe for this to be increased. Young men leaving school do not appear to be greatly attracted to agriculture as a career, perhaps because this subject has been inadequately or unsuitably presented to them at school. Thirty-seven first-year students were in residence at Monze at the beginning of the year in the Seventh Session, together with eleven teachers taking the special one-year course already mentioned. Twenty-five students went on to the second year commencing in October, twelve having fallen by the wayside. Thirty-three new students joined the Eighth Session beginning in October. At Lunzuwa twenty-one students passed their final examination successfully in the Fourth Session which ended in June, 1956. Seventeen students in the Fifth Session entered their second year, and twenty-eight students in the Sixth Session entered their first year.

51. The Department feels the lack of the guidance of a professional Agricultural Education Officer who could take overall responsibility for this training work which is of a specialist nature. The Principals of the schools are to be congratulated upon the success they are achieving in difficult circumstances.

52. The Director of Agriculture was appointed as a member of a special inter-territorial committee called by the Federal Minister of Agriculture to discuss the development of an African Agricultural College in the Federation to provide agricultural education at a post-Cambridge but sub-university level. Discussions were still continuing at the close of the year.

Buildings

53. In all provinces and at the Central Agricultural Research Station officers of the Department have been heavily engaged during the year in erecting buildings of various kinds, particularly African staff houses. Although this work detracts from the time available for agriculture in the short run, in the circumstances there is no escape from it. The record of achievement in the building line is impressive and the benefits are cumulative.

RESEARCH AND SPECIALIST SERVICES

Mount Makulu Central Agricultural Research Station

54. The establishment of the Station was virtually completed by the end of the year. The entire capital cost was provided under a Colonial Research Scheme which was sanctioned in 1950. A further grant has, however, been obtained to provide additional facilities that have been found necessary or desirable in the light of experience for the establishment and development of comprehensive agricultural research services in Northern Rhodesia.

55. The Station comprises twenty-six units of accommodation for European staff as well as housing and accommodation for sixty-eight African Assistants and labourers. The Station, which extends to 2,800 acres, includes a full range of scientific laboratories together with a well-developed mixed farm. It is, therefore, designed to enable the agricultural problems of the Territory to be approached on a broad front. Staff changes have unfortunately interfered to some extent with the continuity of work already started but nevertheless the Station is already playing an important part in the development of the Territory and the Federation. The Chief Research Officer attended as a member the meetings of the Federal Committee on Agricultural Research which is concerned to co-ordinate the agricultural research work of the three territories.

Agricultural Chemistry

56. More than 2,000 soil samples were analysed during the year as well as samples of herbage, oil seeds and other materials to meet the requirements of the Soil Survey, Land Use and other sections of the research services. Considerable time and effort were spent on equipping and reorganising the chemical laboratories so as to speed up the turnover of routine analytical work. Techniques have been reviewed and modified to improve accuracy, particularly with regard to the determination of calcium, magnesium and exchange capacity of soils.

57. Some fifty experiments on maize were continued and the results in general confirmed previous experience. Evidence was accumulated to show that the main maize-growing soil-types in the Territory can carry populations of 12,000 to 15,000 per acre with appropriate fertilising. Populations up to 20,000 plants per acre gave proportionately smaller returns per unit of fertiliser applied. The maximum yield obtained under field conditions was thirty-two bags per acre on strong reddish clay at Mount Makulu and twenty-two bags per acre on sandveld at Muswishi in the Broken Hill district. Trials with nitrogenous fertiliser in association with a basic application of phosphate at rates of 40, 80 and 120 lb. of sulphate of ammonia per acre applied to maize at planting time gave negligible responses. With high plant populations and high rates of fertilisation split side-dressings, for example, 50 per cent at four weeks and 50 per cent at eight weeks after planting, were more effective than single applications of the same total amount of fertiliser. The advantage of the split applications, however, might be offset on economic grounds.

Soil Survey

58. The preparation and writing of the Report on the Soil and Land Use Survey of some 3,000 square miles of the Copperbelt was completed: the printed report by the Government Printer was published in December, 1956. In connection with the Copperbelt Survey a detailed soil survey of some twelve square miles in the Mutundu area near Mufulira was completed in May and the maps, together with relevant information, were handed to the Federal Department of Conservation and Extension for the assessment of areas suitable for intensive European farming. Two hundred and twenty square miles of land were surveyed south-east of Mumbwa township in the Mumbwa district during June and July. A further 200 square miles were completed west and north of Mukulaikwa also in the Mumbwa district in July and August. Ten square miles were surveyed in the Solwezi district to meet the requirements of planned African development in proximity to the Kansanshi Mine.

59. In connection with the resettlement problem associated with the Kariba Hydro-electric Scheme a survey was carried out of some seventy-six square miles near Chirundu. A vegetation map was prepared from aerial photographs. Soil profiles of the different vegetation types were sampled and analysed with a view to assessing the agricultural potential. A close correlation between vegetation and soil was found and it was concluded that further areas of agricultural land in the Gwembe Valley could be detected from aerial photographs with the minimum of ground control. Detailed soil surveys were made of the Department's Chiansi irrigation plot and the Rhodesian Selection Trust's Nanga Polder on the Kafue Flats. To round off a very full season's work, a detailed survey was completed of the Mount Makulu Central Agricultural Research Station.

Ecology

60. With the departure of the Pasture Research Officer on transfer the Ecologist was placed in overall charge of the Pasture and Ecology sections with consequent reorientation of the programme of ecological investigations. These were incorporated into the pasture research programme.

Plant Pathology

61. A collection of fifty native varieties of maize were under trial for resistance to *Helminthosporium* disease. Only three showed any signs of resistance. In trials with weedicides preliminary indications were that the chloracetimide derivative type, for example CDAA, were distinctly effective in the control of Rapoko or Ox Grass (*Eleusine indica*) when applied as a pre-emergence spray in maize. Severe outbreaks of Potato and Tomato Leaf Blight (*Phytophthora infestans*) occurred in the late wet season in the Copperbelt, Broken Hill and Lusaka areas; this disease must now be regarded as firmly established in the Territory. Bacterial rot of potatoes was common and sometimes severe. Thirty-one new diseases of crop plants were recorded. A *Preliminary List of Plant Diseases in Northern Rhodesia* by Dr. E. A. Riley was published as Commonwealth Mycological Institute Paper No. 63 in 1956.

Pasture Research

62. Further introductions of new species have been made. Twenty-nine grass and legume species are being subjected to tests for seasonal composition and behaviour under different management practices. Rhodes grass, Bambatsi panicum, Molasses grass and *Eragrostis curvula* have been established on paddock scale for evaluation in terms of animal production. Ten species and varieties including the above are undergoing palatability trials.

63. Further results from fertiliser trials at several centres in the Territory with Star grass, Makarikari panicum and indigenous veld confirm the previously reported consistent responses to sulphate of ammonia and the sporadic negative response to lime in terms of quantitative measurements obtained by cutting. Ley establishment trials and observations have indicated the need for adapting management to the prevailing situation. On newly broken virgin land early planting can be carried out without danger of serious weed competition. On old arable land, however, thorough cleaning is necessary and consequent late sowing in order to prevent vigorous annual weed growth from interference with the stand. Ley establishment under wide-spaced maize at the time of last cultivation is also a practical proposition; a yield of ten bags maize per acre at six-foot spacing with successful establishment of Bambatsi panicum being achieved at Mount Makulu. In general, however, a high fertiliser application is desirable. Rolling the seedbed before and after sowing further enhances establishment. Both Rhodes grass and Bambatsi panicum have been planted very successfully with a seeds/fertiliser drill, this method proving superior to broadcasting in both economy of seed and efficiency of establishment.

64. Management trials have indicated interesting trends in species composition under different rates of stocking. A trial of three management practices as compared with the use of a weedicide (2,4,5,T.) for the eradication of young acacia seedlings in pastures indicated that the most effective and cheapest method was late burning.

65. Irrigated fodder crops were investigated further and several species were found to compare favourably with lucerne (Hairy Peruvian variety) which may be considered to be firmly established as a most valuable crop. Giant Sainfoin and Black Medick were extremely productive while rape, marrow-stem and thousand head kale, turnips and swedes gave yields comparable with British standards.

Plant Breeding

66. Seasonal conditions were unfavourable for groundnuts. Nevertheless the results of variety trials at three widely separated stations confirmed the outstanding quality of the variety Mwitunde. This variety, which was imported from Tanganyika, proved to be relatively resistant to disease particularly under poor growing conditions. It gave reasonable yields and the oil content is the highest of all of the varieties tested. Further selection work on a number of varieties, strains and selections of groundnuts was continued at Mount Makulu. Interesting and encouraging results were obtained with trials of varieties and strains of dwarf beans (*Phaseolus vulgaris*). Yields of over six bags of dry, shelled beans per acre were obtained in trial plots. Varieties of Lima beans (*P. lunatus*) were particularly encouraging: when planted as late as February, heavy yields were obtained and fruiting continued until the middle of the dry season. Thirteen varieties of soya beans gave encouraging results. For winter cultivation, that is under irrigated conditions, during the cool, dry season, some varieties of wheat have been proved which give considerably better yields than those commonly grown hitherto in Northern Rhodesia. For summer conditions, that is the hot, wet season, several varieties were selected for rust resistance from a large collection but yields were low. Weed competition and damage by termites accentuated the inherently low-yielding potential of many strains and methods of controlling these problems had to be put in hand. Cereal investigations were further extended to include barley, oats and a range of indigenous food crops including kaffir corn and various millets.

Irrigation

67. The question of the agricultural possibilities of the Kafue has been attacked in the most direct manner on two fronts. The Department of Agriculture has developed an experimental polder at Chiansi of some thirty-five acres. This has been made possible through a Colonial Research grant. Protection from flooding involved the construction of an embankment about twelve feet high all round a representative area of some ten miles out of the Flats proper. This in itself was a major undertaking which was only possible with the aid of heavy earth-moving equipment, but was later seen to be relatively simple compared with the agricultural problems. The soil is a remarkably heavy clay, which has posed serious problems of management for crop production. Wheat, barley, rice and a wide range of minor crops were tried out but without success. This, however, was not surprising in view of the hundred and one difficulties that only experience will overcome. At the same time the Rhodesian Selection Trust following a report by Dutch consultants made a start with a relatively large-scale pilot scheme of 600 acres at Nanga on the south bank of the river. At both polders high salinity in the deep sub-soil appears to constitute a threat and is one more factor that has to be watched. At Chiansi enormous numbers of ducks have cleaned up paddy almost as soon as it was planted. Even the sportsmen on the staff expressed sympathy with the agriculturists!

Tobacco

68. Responsibility for tobacco research and investigations passed to the Federal authorities as from 1st January, 1956. The Chief Tobacco Adviser remained, however, for a time, pending going on leave and subsequent transfer to Uganda. During the time he compiled a report summarising the results of four years of experiments and investigations. This was

printed and published as Department of Agriculture Bulletin No. 12 of 1956, under the title "Review of Research on Flue-cured Virginia Tobacco in Northern Rhodesia" by J. C. Collins, Chief Tobacco Adviser price 3s. 6d. The Review deals with twenty-two experiments on a wide range of problems including variety and fertiliser trials, seedbeds, disease-control, chemical control of suckers and fourteen surveys of methods of production including soils, leaf analysis, time of planting, crop rotation and many other aspects of the industry.

CONFERENCES, BOARDS AND COMMITTEES

69. Officers of the Department have continued to play a full part during the year as members of official boards and committees. In one capacity or another the Department is represented upon the following:

- Natural Resources Board.
- Maize Control Board.
- Copperbelt Special Area Committee.
- African Farming Improvement Fund Committee.
- Eastern Province Agricultural Produce Board.
- International Red Locust Control Council.
- Southern African Regional Committee for Conservation and Utilisation of the Soil.
- Federal Interim Grain Marketing Committee.
- Federal Standing Committee on Agricultural Production.
- Federal Marketing Council.
- Federal Research Committee.
- Water Board.

Provincial and District Agricultural Officers also served as members of Provincial and Area Development Teams. The Director was nominated as an Official Member for the July meeting of Legislative Council.

LEGISLATION

70. The following *Gazette* and Government Notices affecting the Department were published:

- General Notice No. 2—Notification of Enactment of Ordinance No. 61 of 1955. The Non-African Agriculture (Transfer to the Concurrent List) Ordinance, 1955.
- General Notice No. 31—Transfer of European Agriculture.
- General Notice No. 301—Board of African Agriculture—Membership.
- General Notice No. 1229—Board of African Agriculture—Membership.
- General Notice No. 812—Price of African Grown Maize.
- General Notice No. 1031—The Maize Control Board—Membership.
- General Notice No. 758—Producer Price of Wheat.
- General Notice No. 1080—Change of Address—Central Agricultural Research Station.
- General Notice No. 1081—Telegraphic Address—Central Agricultural Research Station.
- General Notice No. 1384—Eastern Province Agricultural Produce Board.
- General Notice No. 951—Appointment to Legislative Council, Mr. C. W. Lynn, M.B.E.

Government Notices.

- Government Notice No. 202—Agricultural Marketing Council Act, 1956.
- Government Notice No. 159—Eastern Province Agricultural Produce Ordinance—Producer Price of Maize.
- Government Notice No. 160—Eastern Province Agricultural Produce Ordinance—Producer Price of Groundnuts.

PUBLICATIONS

71. The following departmental Bulletins and Reports were published throughout the year:

- Bulletin No. 11—*African Farming Improvement in the Plateau Tonga Maize Areas of Northern Rhodesia*, by C. E. Johnson, Chief Agricultural Officer.
- Bulletin No. 12—*Review of Research on Flue-cured Virginia Tobacco in Northern Rhodesia*, by J. C. Collins, Chief Tobacco Adviser.
- Report of a Soil and Land Use Survey, Copperbelt, Northern Rhodesia*, by A. T. Wilson, Agricultural Officer, A. O. Ballantyne, Soil Surveyor, N. R. Brockington, Ecologist, and A. M. M. Rees, Agricultural Economist—with accompanying maps. Government Printer, Lusaka—Price £2 2s.

Experience has shown that it is only in the printed form that the record of much of our work survives. Publications are regarded therefore as being of special importance to the Department. Opportunity is taken to express thanks to the Government Printer and his staff for outstanding co-operation during the year.

VISITORS

72. Mr. C. N. Hayter, Senior Horticulturist, Federal Ministry of Agriculture, Salisbury, Southern Rhodesia.
Dr. Fraser Darling, Faunal Survey.
Mr. J. H. Wallace, C.M.G., Northern Rhodesia Commissioner in London.
Mr. J. A. Whellan, Chief Entomologist, Department of Research and Specialist Services, Salisbury, Southern Rhodesia.
Mr. B. J. Silk, Lecturer in Tropical Agriculture, Cambridge University.
Dr. H. G. Weizmann, Inter-Governmental Committee on European Migration.
Dr. J. C. Ross, Secretary-General, Southern African Regional Committee for the Conservation and Utilisation of the Soil, Pretoria.
Mr. C. J. Rose, Agricultural Field Research Department, Frankenwald Research Station.
Dr. S. D. Neumark, Stanford University, California, United States of America.
Mr. Elia Salzman, Tobacco Merchant, London and Salisbury.
Dr. H. L. Shantz } Professors of Ecology, University of Arizona, United States
Dr. B. L. Turner } of America.
Dr. O. Kohnke, Chief Agronomist, Kali Organisation.
Sir Laurence Helsby, K.B.E., C.B., First Civil Service Commissioner, United Kingdom.
Mr. D. Rhind, Secretary of the Committee for Colonial Agricultural Animal Health and Forestry Research.

IN CONCLUSION

73. I would like to take this opportunity to express my appreciation and gratitude to all members of the Department for their sound application to duty and excellent co-operation which has enabled the Department to give a good account of itself in spite of the many uncertainties inevitable with constitutional change. It would be fitting for me to record a special tribute to Mr. J. Neil Clothier, until recently Chief Conservation Officer, who retired at the end of the year after more than a quarter of a century's continuous service for agriculture in Northern Rhodesia.

4th March, 1957.

C. W. LYNN,
Director of Agriculture.

APPENDIX I

DEPARTMENT OF AGRICULTURE

Staff Position as at 31st December, 1956

<i>Post</i>	<i>Establishment</i>	<i>Vacancies</i>
Director	1	—
Deputy Director	1	—
Agricultural Economist	1	1
Secretary	1	—
Chief Agricultural Officers	3	—
Agricultural Officers	25	5
Conservation Officers	2	1
Principal Agricultural Supervisors	6	—
Agricultural Supervisors	48	—
Draughtsman	1	1
Chief Research Officer	1	—
Ecologist	1	—
Agricultural Chemists	2	1
Soil Chemist	1	1
Soil Surveyor	1	—
Plant Breeders	2	—
Plant Pathologist	1	—
Pasture Research Officer	1	1
Entomologist	1	—
Assistant Professional Officer	1	—
Farm Superintendent	1	—
Research Assistants	5	1
Assistant Technical Officer	1	1
Accountants	2	—
Clerks—Male	7	—
Clerks—Female	13	—

AFRICAN STAFF

Survey Assistants	8	1
Clerks	50	4
Agricultural Assistants	283	63
Laboratory Assistants	6	4
Head Agricultural Capitaos	24	2
Senior Agricultural Capitaos	35	3
Agricultural Capitaos	283	13
Senior Orderlies and Orderlies	88	4
Bricklayer	1	—
Carpenters	6	—
Chauffeurs	8	—
Drivers	34	3
Station Handymen	9	—
Telephone Operator	1	—
Cooks	3	—

APPENDIX II

STAFF LIST AS AT 31st DECEMBER, 1956

HEADQUARTERS, LUSAKA

C. W. Lynn, M.B.E., DIP. AGRIC. (WYE), A.I.C.T.A., Director.
M. Halerow, O.B.E., B.SC. (AGRIC.), DIP. AGRIC. (CANTAB.), A.I.C.T.A., Deputy Director.
C. E. Johnson, B.SC., DIP. AGRIC. (CANTAB.), A.I.C.T.A., Chief Agricultural Officer.
R. B. Reid, B.SC., N.D.A., Chief Agricultural Officer.
N. M. W. Irvin, Secretary.
J. Meade, Accountant.
H. de B. Barwis, Accountant.
D. A. Grobecker, Clerk.
E. F. Dowdall, Clerk.
F. Gardiner, Clerk.
Miss G. M. N. Briggs, Stenographer.
Mrs. P. M. Harrington, Stenographer.
Mrs. J. E. Earle, Clerk/Typist.
Mrs. D. Lightfoot, Temporary Clerk (Accounts).
Mrs. C. J. Gourdie, Registry Clerk.
Mrs. J. Graham, Registry Clerk.

SPECIALIST SERVICES

J. Wilson, B.SC. (BOTANY), Chief Research Officer, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Agronomy:

R. B. Symington, B.SC., D.T.A., Agricultural Officer, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Chemistry:

J. B. M. Vogt, B.SC. (CHEMISTRY), Agricultural Chemist, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

K. L. H. Dubber, Research Assistant, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

F. P. Geddes, Research Assistant, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

J. K. McPhillips, Nat. Cert. (Chem.), Research Assistant, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Pasture Research:

N. R. Brockington, B.SC. (BOT. LONDON), DIP. AGRIC. SC. (CANTAB.), Ecologist, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

T. Davies, B.SC., Agricultural Supervisor, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

G. McI. Burnie, Agricultural Supervisor, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Plant Pathology:

A. Angus, B.SC., Plant Pathologist, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Miss M. L. Lister, B.SC., Research Assistant, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Land Use Survey:

A. O. Ballantyne, B.SC., PH.D., Soil Surveyor, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

G. A. Perfect, Agricultural Supervisor, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

W. C. Verboom, DIP. AGRIC., Conservation Officer (Planning), Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

P. G. Jones, Agricultural Supervisor, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Farm Management:

T. J. Greatrex, Farm Superintendent, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

J. A. H. Smith, Agricultural Supervisor, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Plant Breeding:

B. E. Mounter, B.SC., Plant Breeder (Wheat), Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

J. Smartt, B.SC., DIP. AGRIC. (CANTAB.), D.T.A., Plant Breeder (General), Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

E. H. K. Mudenda, B.SC., B.A., Asst. Professional Officer, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Buildings:

P. Lindeque, Building Foreman (seconded from Public Works Department) (on leave).

Administration:

K. G. Walker, Clerk, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Miss M. Booth, Clerk, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Mrs. R. J. Coble, Clerk, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Special Investigations—Kafue Flats:

J. R. E. Hindson, B.A., A.I.C.T.A., Senior Agricultural Officer, Lusaka.

H. Balfourt, DIP. AGRIC., Agricultural Supervisor, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Gwembe Valley Resettlement Scheme:

J. H. Rhodes, B.SC., DIP. AGRIC. (CANTAB.), D.T.A., Agricultural Officer, Central Agricultural Research Station, P.O. Box 7, Chilanga (Lusaka).

Entomology:

Miss K. F. Salmond, B.SC., D.I.C., PH.D., Entomologist. Seconded to Maize Control Board, Lusaka.

African Agricultural Assistants, 6.

African Agricultural Capitaos, 8.

SOUTHERN PROVINCE

C. J. McK. Krige, B.SC. (AGRIC.), Chief Agricultural Officer, Choma.
 A. M. Donaldson, Agricultural Supervisor, Choma (Mapanza).
 A. B. C. Collocott, Clerk, Choma.
 Mrs. G. von Horsten, Temporary Clerk, Choma.
 Mrs. T. McMullen, Stenographer (on leave).
 J. E. Mansfield, B.SC. (WYE), DIP. AGRIC. (READING), Agricultural Officer, Monze.
 I. L. Edwards, Principal Agricultural Supervisor, Monze.
 A. R. MacLachlan, Agricultural Supervisor, Monze.
 K. D. Reed, N.D.A., C.D.A., DIP. FARM MAN., Agricultural Supervisor, Monze.
 B. J. O'N. Shepherd, Principal Agricultural Supervisor, Monze Agricultural Training School, Monze.
 W. F. v.d. B. Morkel, B.SC., D.T.A., Agricultural Officer, Kalomo.
 E. G. Dabinett, Principal Agricultural Supervisor, Kanchomba.
 G. J. J. van Rensburg, DIP. AGRIC., Agricultural Supervisor, Magoye.
 E. R. Woollard, DIP. HORTICULTURE, Agricultural Supervisor, Mapangazia.
 J. S. D. M. Johnstone, M.B.E., Agricultural Supervisor, Mapangazia.
 S. F. Kandunda, Scale "C" Clerk, Choma.
 African Agricultural Assistants: 69.
 African Agricultural Capitaos: 17.

GWEMBE VALLEY RESETTLEMENT SCHEME

C. S. Mitchell, Principal Agricultural Supervisor, Gwembe.
 G. D. Nicholson, Agricultural Supervisor, Gwembe.
 D. K. R. Bray, Agricultural Supervisor, Sinazongwe.
 T. R. A. Witting, Agricultural Supervisor, Changa.
 I. C. M. Paterson, Agricultural Supervisor, Sinazongwe.

CENTRAL PROVINCE

H. H. Roberts, B.SC. (AGRIC.), Agricultural Officer, Broken Hill.
 G. N. Ball, Agricultural Supervisor, Broken Hill (Rural).
 T. Dixon, Clerk, Broken Hill.
 Mrs. F. Langley, Temporary Part-time Clerk, Broken Hill.
 H. L. M. Hewitt, Agricultural Supervisor, Mumbwa.
 R. Simms, Agricultural Supervisor (on leave).
 D. T. Harwood, C.D.A., Agricultural Supervisor, Serenje.
 J. G. Edwards, B.SC., D.T.A., Agricultural Officer, Chalimbana (Soli Reserve).
 J. H. S. Perioli, Agricultural Supervisor, Chalimbana (Soli Reserve).
 A. F. Nicoll, Agricultural Supervisor, Sala Reserve.
 B. L. Batwell, B.SC., Agricultural Officer, Mkushi.
 A. P. Lowe, DIP. AGRIC., Agricultural Supervisor, Mukulaikwa.
 R. H. Howard, M.B.E., Principal Agricultural Supervisor (on leave pending retirement).
 Richard Nyirenda, B.E.M., Scale "C" Agricultural Assistant, Keembe.
 African Agricultural Assistants: 39.
 African Agricultural Capitaos: 55.

EASTERN PROVINCE

F. Durocher-Yvon, M.B.E., DIP. AGRIC., Agricultural Officer, Fort Jameson.
 K. D. Ransom, Clerk, Fort Jameson.
 Mrs. H. Schallenberg, Temporary Clerk, Fort Jameson.
 P. Greening, B.SC., DIP. AGRIC. (CANTAB.), D.T.A., Agricultural Officer, Fort Jameson (Ngoni Areas).
 W. A. Denchfield, Principal Agricultural Supervisor, Fort Jameson (Ngoni Areas).
 R. N. Coster, B.SC., D.T.A., Agricultural Officer, Petauke.
 A. H. Farncombe, Agricultural Supervisor, Petauke.
 P. W. P. Madge, Agricultural Supervisor, Petauke.
 M. J. Mansfield, Agricultural Supervisor, Petauke.
 J. D. Minchinton, Agricultural Supervisor, Kalichero.
 J. Thomson, Agricultural Supervisor, Chadiza.
 P. J. Fisher, Agricultural Supervisor, Katete.
 T. D. Quiery, Agricultural Supervisor, Lundazi.
 W. R. Lindsay-Stewart, Agricultural Supervisor (seconded to Provincial Administration).
 G. B. Emslie, Agricultural Supervisor (on leave).
 African Agricultural Assistants: 48.
 African Agricultural Capitaos: 114.

WESTERN AND NORTH-WESTERN PROVINCES

J. S. Blacklock, DIP. AGRIC., C.D.D., A.I.C.T.A., Agricultural Officer, Ndola.
 R. M. Wood, Agricultural Supervisor, Ndola (Rural).
 P. W. Lake, Agricultural Supervisor, Ndola (Rural).
 Mrs. A. R. Theaker, Temporary Clerk, Ndola.
 E. L. de S. Mason, DIP. AGRIC., Agricultural Supervisor, Solwezi.
 P. A. Henderson, Agricultural Supervisor, Kasempa.
 P. Devonald, B.SC., D.T.A., Agricultural Officer, Balovale.
 A. W. Gow, Agricultural Supervisor, Balovale.
 A. T. Wilson, B.SC., DIP. AGRIC. (CANTAB.), D.T.A., Agricultural Officer (on leave).
 African Agricultural Assistants: 25.
 African Agricultural Capitaos: 47.

NORTHERN PROVINCE

F. J. Smart, B.A., DIP. AGRIC. (CANTAB.), A.I.C.T.A., Agricultural Officer, Kasama.
J. M. Frew, Principal Agricultural Supervisor, Kasama.
Mrs. J. E. Jones, Temporary Clerk, Kasama.
P. M. McIntyre, Agricultural Supervisor, Chinsali.
J. H. Alder, Agricultural Supervisor, Lunzuwa (Abercorn).
J. J. Turner, Agricultural Supervisor, Lunzuwa Agricultural Training School, Lunzuwa.
A. C. Downer, N.D.A., C.D.A., Agricultural Supervisor, Isoka.
D. R. MacKay, B.SC., D.T.A., Agricultural Officer, Fort Rosebery.
O. R. Tennant, Agricultural Supervisor, Kawambwa.
W. V. Morony, Agricultural Supervisor (on leave pending retirement).
A. R. Fraser, Agricultural Supervisor, Luwingu.
D. F. Wallace, Agricultural Supervisor (on leave).
Bethuel Kapota, Scale "C" Agricultural Assistant, Lunzuwa.
African Agricultural Assistants: 73.
African Agricultural Capitaos: 68.

BAROTSELAND PROTECTORATE

J. A. Allan, B.SC. (AGRIC.), Agricultural Officer, Mongu.
M. W. Singer, DIP. AGRIC., Agricultural Supervisor, Mongu.
Mrs. M. W. Singer, Temporary Part-time Clerk, Mongu.
V. W. Meyer, Agricultural Supervisor, Mongu.
A. S. Heaton-Smith, N.D.A., C.D.A., Agricultural Supervisor, Mankoya.
African Agricultural Assistants: 23.
African Agricultural Capitaos: 33.
